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genera—Machærodus, Mastodon, Leptobos, Palæoryx and Palæoreas—are extinct. Pliocene mammals, but little altered, yet occur in the Sunda islands; the Anoa is close to the Siwalik Hemibos, *Bos etruscus* is a Bibos, close to the Banting of Java, the Pliocene stags, tapirs and rhinoceroses are nearly repeated by the forms now living in Southeastern Asia, and *Sus verrucosus* of Java is close to the Pliocene *Sus giganteus.* Professor Boyd Dawkins believes that two of the deer of the Pliocene of the Val d'Arno, as also the Hippopotamus, are identical with existing species.——A before unknown deposit of Pliocene age at St. Erth's, near the Land's End, Cornwall, has yielded fifty species of mollusks, of which all but eleven or twelve are extinct.

MINERALOGY AND PETROGRAPHY.[1]

NEW MINERALS.— 1st. *Bertrandite.*—This mineral, mentioned by Bertrand in 1880 (Bul. soc. min. d. Fr., III, 96) as a probably new aluminum-silicate from Barbin, near Nantes, is shown by Damour[2] to have the composition $4BeO$, $2SiO_2$, H_2O, on which account he proposes for it the above name. It occurs in druses of a coarse pegmatite. Its system of crystallization is orthorhombic; axial ratio $a:b:c = 0.5619:1:0.5871$. Observed planes $0P$, ∞P, $\infty P\bar{\infty}$, $\infty P\bar{3}$, $\infty P\breve{\infty}$, $\infty P\breve{3}$, $P\breve{\infty}$, $3P\breve{\infty}$. Plane of the optical axes is $\infty P\breve{\infty}$. Principal bisectrix is $\breve{a}$. Dispersion $\rho < \upsilon$.[2]

2d. *Evigtokite* is a name applied by Flight[4] to a mineral of the cryolite group from Greenland having the composition CaF_2, AlF_3, H_2O. It is composed of masses of minute, white, transparent crystals.

3d. *Liskeardite* of the same writer occurs in layers sometimes a quarter of an inch thick, at the mines of Cornwall. It is fibrous in structure, of a white color or with a greenish or bluish tinge. Its composition is $(Al, Fe) AsO_4$, $8H_2O$. Analysis:

Fe_2O_3	Al_2O_3	As_2O_5	SO_3	CuO	CaO	H_2O
7.64	28.229	26.962	1.111	1.027	0.719	34.053

4th. *Pinnoite* is a new borate from Stassfurt described by H. Staute.[5] Its crystal form could not be determined. Sp. gr. 2.27. Hardness 3–4. Its composition is:

MgO	B_2O_3	H_2O	Fe	Cl
24.45	42.50	32.85	0.15	0.18

which gives the formula $MgB_2O_4 + 3H_2O$.

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[1] Edited by Dr. GEO. H. WILLIAMS, of the Johns Hopkins University, Baltimore.

[2] Bull. soc. min. de Fr., VI, 1883, p. 252.

[3] Ib., p. 249.

[4] Journal Chem. Soc., Vol. 43, March, 1883, p. 140.

[5] Berichte der deutschen chemischen Gesellschaft, XVII, No. 12, p. 1584, July, 1884.

5th. *Avalite.*—S. M. Lasanitoch,[1] of Belgrade, gives this name to a new chromium-aluminium silicate occurring in thin green scales in the quartz of the quicksilver deposits at Avala, near Belgrade. An analysis of the purest specimen, which was, however, mixed with some chromite and sand, gave the following result:

SiO_2	Cr_2O_3	Al_2O_3	K_2O	Fe_2O_3	MgO	chromite	H_2O	loss
56.13	14.59	14.37	3.54	1.10	0.43	1.68	2.39	5.38

6th. *Zunyite.*—Mr. Hillebrand,[2] of the U. S. Geol. Survey, now stationed at Denver, Col., describes remarkable tetrahedral crystals of a new mineral which he found imbedded in an uncrystallized sulphide of lead and arsenic, occurring at the Zuñi mine on Anvil mountain, near Silverton, San Juan county, Col. These crystals are mostly very minute, rarely 5^{mm} in diameter. They show the forms $\frac{O}{2}, -\frac{O}{2}, \infty O \infty$ and ∞O or $\frac{mO}{2}$, and are quite isotropic. The smallest are clear and transparent; the larger ones dark on account of black inclusions. Sp. gr. 2.875 at 15° C. Luster glossy, cleavage octahedral, hardness 7. The mean of several analyses gave:

SiO_2	Fe_2O_3	Al_2O_3	K_2O	Na_2O	H_2O	P_2O_5	F	Cl
24.33	0.20	57.88	0.10	0.24	10.89	0.60	5.61	2.91

sum 102.76 — O for Cl and F (3.02) = 99.74.

Formula, $9R_2O$, $8Al_2O_3$, $6SiO_2$, with part of the O replaced by Cl and F. The black inclusions were shown to be titanic oxide.

7th. *Guitermanite.*—The metallic sulphide in which the above described crystals of zunyite were imbedded, was found to have the composition $10PbS$, $3As_2S_3$, being likewise a new mineral to which the same author applies the name Guitermanite.

8th. *Koninckite.*—M. Cesàro[3] has recently described a new hydrous phosphate of iron from Visé in Belgium. It occurs in spherical groups of radiating, nearly colorless monoclinic needles associated with richellite, another new mineral lately described by the same author (vid. NATURALIST, Jan., 1884, p. 65.) Koninckite has one perfect cleavage, H = 3.5; G = 2.3. Its composition is:

P_2O_5	Fe_2O_3	H_2O	Al_2O_3 (difference)	total
38.4	33.9	26.8	4.5	100

It is named after Professor De Koninck of Liége.

9th. *Endlichite or vanadium mimetite.*—Professor Genth[4] has found that certain straw-yellow crystals occurring at the silver mines of Southern New Mexico have the composition

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[1] Berichte der deutschen chemischen Gesell., XVII, No. 13, p. 1774, Aug., 1884.

[2] Proceedings of the Colorado Scientific Society, Vol. I, 1883–84, p. 124.

[3] Mem. Soc. Geol. Belgique, XI, p. 247.

[4] Contributions from the Laboratory of the University of Pennsylvania, No. XXIII. Read before the American Philosophical Society, April 17, 1885.

$Pb_5 Cl (AsO_4)_3 + Pb_5 Cl (VO_4)_3$ or about equal proportions of vanadinite and mimetite. He has assigned to them the name Endlichite in honor of Dr. F. M. Endlich, superintendent of the Sierra mines at Lake valley, N. M. The same paper contains new analyses of vanadinite and a crystallographic investigation, by Professor G. vom Rath, of the New Mexican decloizite, illustrated by four figures. These crystals, which are the best ones thus far known, indicate that the mineral is orthorhombic, as was surmised by Des Cloizeaux instead of monoclinic as held by Websky. Associated with the vanadinite of Sierra Grande fine crystals of iodyrite were also found.

BOTANY.[1]

AMERICAN MEDICINAL PLANTS.—We recently noticed the first fascicle of this work, by Dr. Millspaugh, as worthy of patronage. An examination of the second fascicle confirms our favorable opinion. The illustrations are very good, and will not only serve admirably their purpose of enabling the medical student to recognize the various species of medicinal plants, but they will be found of value to the teacher or student of ordinary botany. In the second fascicle there are colored plates of *Actæa spicata*, *Carya alba*, *Cephalanthus occidentalis*, *Cypripedium pubescens*, *Equisetum hyemale*, *Juglans cinerea*, *Mitchella repens*, *Thuja occidentalis*, *Viola tricolor*, etc., etc., thirty in all.

DEVELOPMENT OF STOMATA OF THE OAT.—Before the stomata appear the epidermis is composed of quadrangular cells, which afterwards grow much faster in length than in breadth. The mother-cell of a stoma is cut off from the end of one of these cells, and sometimes each cell in a row furnishes a stoma (Fig. 1 *a*). This mother-cell rapidly increases in size, and large masses of protoplasm touching the cell soon become evident in the cells adjacent to the sides (Fig. 1 *b b*). This gathering of protoplasm is preparatory to the formation of accessory cells, which are at first nearly semicircular, and are cut out of the adjacent cells, one on each side of the mother-cell (Fig. 2 *b b*). The central and accessory cells now enlarge in about the same proportion until the former divides into two guard cells (Fig. 4); after this the accessory cells encroach upon the guard cells until in the mature stoma the latter are narrower through the center than at the ends; and the width of the whole four cells is but little more than of one single epidermal cell (Fig. 6).

The behavior of the protoplasm is very characteristic, the general rule is as follows: The mother-cell and the accessory cells are both at first full of rich protoplasm. In the accessory cells this tends to condense in the center; vacuoles first appear in the ends of the cells (Fig. 3), these increase in size with the develop-

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[1] Edited by PROFESSOR CHARLES E. BESSEY, Lincoln, Nebraska.